IN THE CLAIMS:

The following listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A computer-implemented method comprising:

receiving user input selecting one or more simulation engines corresponding to a value chain;

~~(a)~~ assembling a set of models that represent components of [[a]] the value chain, wherein each of the models of said set includes one or more variables, where each of said one or more variables is defined on a corresponding range, wherein at least one of the models of said set of models is a geocellular reservoir model;

~~(b)~~ selecting values of the variables in their respective ranges to create instantiated models;

~~(c)~~ assembling the instantiated models into a workflow;

~~(d)~~ executing the one or more simulation engines on the workflow to generate data output; and

~~(e)~~ storing the selected values of the variables and the data output from the one or more simulation engines to a memory;

wherein the one or more simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics.

2. (Cancelled)

3. (Currently Amended) The method of claim 1 further comprising: repeating said selecting, said assembling the instantiated models, said executing and said storing. ~~(b), (c) and (d).~~

4. (Original) The method of claim 3, wherein said repeating covers all possible combinations of values of the variables in their respective ranges.

5. (Original) The method of claim 3, wherein said repeating achieves a sensitivity analysis by scanning each variable through the corresponding range, one at a time, while maintaining all other variables at nominal values.

6. (Currently Amended) The method of claim 3, wherein said repeating uses an experimental design algorithm to generate combinations of variable values in each iteration of said repeating ~~of (b), (c) and (d)~~.

7. (Original) The method of claim 1, wherein said selecting of values of the variables includes computing quantiles of one or more user-specified probability distributions.

8. (Original) The method of claim 1, wherein said selecting of values of the variables is based on a Latin Hypercube sampling of the variables.

9. (Original) The method of claim 1, wherein said selecting of values of the variables includes choosing a value in a user-specified quantile range $[Q_A, Q_B]$ based on a probability distribution specified by a user for a first one of the variables, wherein A and B are integers between zero and 100 inclusive.

10. (Currently Amended) A computer-implemented method comprising:

receiving input specifying a user's selection of one or more simulation engines associated with a value chain;

~~(a)~~ assembling a set of models that represent components of [[a]] the value chain, wherein each of the models of said set includes one or more random variables, wherein at least one of the models of the set of models is a geocellular reservoir model;

~~(b)~~ instantiating the random variables of each model to determine instantiated models;

~~(c)~~ assembling the instantiated models into a workflow;

~~(d)~~ executing the one or more simulation engines on the workflow to generate data output; and

~~(c)~~ storing the data output from the one or more simulation engines to a memory;

wherein the one or more simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics.

11. (Cancelled)

12. (Currently Amended) The method of claim 10 further comprising: repeating said instantiating, said assembling the instantiated models, said executing and said storing. ~~(b), (c) and (d).~~

13. (Currently Amended) A computer-implemented method comprising:

~~(a)~~ computing an instantiated value of each random variable in a set of random variables;

~~(b)~~ selecting a first geocellular reservoir model from a collection of geocellular reservoir models based on a first subset of the instantiated values~~, wherein the collection of models are geocellular reservoir models~~;

resolving uncertain dates for events in one or more schedules using a second subset of the instantiated values in order to determine resolved event dates;

~~(c)~~ executing a simulation engine on an input data set including the first geocellular reservoir model and the resolved event dates; and

~~(d)~~ capturing data generated by the simulation engine in response to said execution to a storage medium;

wherein the simulation engine includes one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics.

14. (Cancelled)

15. (Previously Presented) The method of claim 13 wherein the simulation engine also includes an economic computation engine.

16. (Previously Presented) The method of claim 13, wherein the input data set also includes one or more of: a model of reservoir physical characteristics, a well location

model, a well plan model, a well drilling schedule model, a well production schedule model, a capital investment expense model, an operating expense model, and a fiscal regime model.

17. (Currently Amended) A computer system comprising:

a memory storing ~~configured to store~~ program instructions and data;

a processor configured to read the program instructions from the memory, wherein [[,]] ~~in response to execution of~~ the program instructions are executable by the processor to~~, the processor is operable to~~:

~~(a)~~ assemble a set of models, wherein each of the models of said set includes one or more variables, where each of said one or more variables is defined on a corresponding range, wherein at least one of the models of said set is a geocellular reservoir model;

~~(b)~~ automatically select values of the variables in their respective ranges to create instantiated models;

automatically execute a well-perforator program on one or more well plans included in the instantiated models in order to determine perforation locations for the one or more well plans;

~~(c)~~ automatically assemble the instantiated models and the perforation locations into a workflow; and

~~(d)~~ automatically execute one or more simulation engines on the workflow;

wherein the one or more simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics.

18. (Currently Amended) The computer system of claim 17, wherein the program instructions are executable by the processor to~~, in response to execution of the program instructions, the process is further operable to~~:

~~(e)~~ automatically store data output from the one or more simulation engines to the memory.

19. (Currently Amended) A computer-readable memory medium storing ~~configured to store~~ program instructions, wherein the program instructions are configured to direct one or more computers to perform operations comprising:

~~(a)~~ assembling a set of models, wherein each of the models of said set includes one or more variables, where each of said one or more variables varies in a corresponding range, wherein at least one of the models of said set is a geocellular reservoir model;

~~(b)~~ automatically selecting values of the variables in their respective ranges to create instantiated models;

automatically executing a well-perforator program on one or more well plans included in the instantiated models in order to determine perforation locations for the one or more well plans;

~~(c)~~ automatically assembling the instantiated models and the perforation locations into a workflow;

~~(d)~~ automatically executing one or more simulation engines on the workflow;

wherein the one or more simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics.

20. (Currently Amended) The computer-readable memory medium of claim 19, wherein the program instructions are further configured to direct the one or more computers to implement the operation of:

~~(e)~~ automatically storing data output from the one or more simulation engines to a memory.

21. (Currently Amended) A computer-implemented method comprising:

performing setup operations to assemble a case comprising a set of planning variables and models, wherein at least one of said models is a geocellular reservoir model;

executing a calculation loop one or more times, wherein each iteration of the calculation loop comprises:

~~(a)~~ automatically generating instantiations of the planning variables to determine instantiated models from the models;

automatically executing well-perforator software on one or more well plans included in the instantiated models in order to determine perforation locations associated with the one or more well plans;

~~(b)~~ automatically executing one or more simulation engines on the instantiated models and the perforation locations; and

~~(c)~~ automatically capturing the instantiated planning variables and output data from the one or more simulation engines onto a storage medium;

wherein the one or more simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics.

22. (Cancelled)

23. (Currently Amended) The method of claim 21, wherein said capturing comprises storing the instantiated planning variables and the simulation output data onto the storage medium in a relational database format.

24. (Currently Amended) The method of claim 21, wherein said generating instantiations of the planning variables includes:

calculating a set of random numbers; and

calculating quantile values using the random numbers and user-defined probability distributions associated with the planning variables.

25. (Previously Presented) The method of claim 21, wherein the one or more simulation engines include an economic computation engine.

26. (Cancelled) ~~The method of claim 21, wherein the calculation loop further includes: executing a well perforator prior to executing the one or more simulation engines.~~

27. (Original) The method of claim 21, wherein said performing setup operations includes receiving user input specifying execution qualifying data corresponding to the case.

28. (Original) The method of claim 27, wherein the execution qualifying data includes a number of iterations of the calculation loop.

29. (Original) The method of claim 27, wherein the execution qualifying data includes a set of attainable values for each planning variable.

30. (Original) The method of claim 27, wherein the execution qualifying data include data characterizing probability distributions for one or more of the planning variables.

31. (Currently Amended) A computer-implemented method comprising:

assembling ~~receiving user input to assemble~~ a first case, comprising a first set of models and planning variables for components of a value chain, in response to first user input, wherein the first set of models and planning variables includes at least one geocellular reservoir model;

assembling a second case by receiving second user input specifying modifications to the first set of models and planning variables and modifying the first set of models and planning variables according to said second user input;

~~receiving user input to assemble a second case based on the first case;~~

storing the first case, the second case and the modifications to the first set of models and planning variables ~~differences between the first case and second case~~ in a memory medium;

displaying an indication of the first case, the second case, and a parent child relationship between the first case and the second case;

conditionally displaying the modifications to the first set of models and planning variables ~~differences between the first case and second case~~ in response to a user

request.

32-41. (Cancelled)

42. (Currently Amended) A computer-implemented method comprising:

~~(a)~~ receiving user input characterizing probability distributions for planning variables associated with a set of models, wherein the set of models includes one or more geocellular reservoir models;

~~(b)~~ generating instantiated values of the planning variables;

~~(c)~~ assembling one or more input data sets for one or more simulation engines from the set of models and the instantiated values, wherein said assembling includes resolving uncertain event dates in one or more schedules included in the set of models based on a first subset of the instantiated values;

~~(d)~~ executing the one or more simulation engines on the one or more input data sets; and

~~(e)~~ storing the instantiated values of the planning variables and data output from the one or more simulation engines to a storage medium;

wherein the one or more simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics.

43. (Cancelled)

44. (Currently Amended) The method of claim 42 further comprising: performing said generating, said assembling, said executing and said storing ~~(b), (c), (d) and (e)~~ a number of times until a termination condition is achieved.

45. (Previously Presented) The method of claim 42 further comprising: executing a reservoir model scaling engine to scale said one or more geocellular reservoir models of said set of models to a lower resolution.

46. (Cancelled) ~~The method of claim 42 further comprising: executing a schedule resolver program which generates instantiated schedules based on a first subset of the set of models and a first subset of the instantiated values.~~

47. (Original) The method of claim 42 further comprising: executing a well perforator program based on a second subset of the set of models and a second subset of the instantiated values.

48. (Currently Amended) A computer-implemented method comprising:

(a) receiving user input characterizing a set of planning variables associated with a set of models;

(b) generating instantiated values of the planning variables;

(c) assembling a first input data set using a first subset of the instantiated values and a first subset of the set of models, and assembling a second input data set using a second subset of the instantiated values and a second subset of the set of models, wherein the first subset of the set of models includes a geocellular reservoir model;

(d) executing a well-perforator program to determine ~~determining~~ well perforation locations for wells in the first input data set, and appending the well perforation locations to the first input data set;

(e) determining instantiated schedules using a third subset of the instantiated values and a third subset of the models, and appending the instantiated schedules to the first input data set and the second input data set;

(f) executing one or more physics-based flow simulators on the first input data set to generate flow data for oil, gas and water and appending the flow data to the second input data set, wherein the one or more physics-based flow simulators are configured to simulate reservoirs, wells and surface-pipeline hydraulics;

(g) executing an economic computation engine on the second input data set to generate economic output data;

(h) storing the instantiated values of the planning variables, the flow data and the economic output data to a storage medium in a relational database format; and

(i) repeating (b), (c), (d), (e), (f), (g) and (h) until a termination condition is achieved.